

### ABSTRACT

First and second electrodes and magnets between the electrodes define an enclosure. The first electrode is biased at a high voltage to produce a high intensity electrical field. The second electrode is biased at a low negative voltage by a low alternating voltage to  
5 produce a low intensity electrical field. Electrons movable in a helical path in the enclosure near the first electrode ionize inert gas molecules in the enclosure. A wafer having a floating potential and an insulating layer is closely spaced from the second electrode. The second electrode and the wafer define plates of a first capacitor having a high impedance. The wafer and the inert gas ions in the enclosure define opposite plates of a second capacitor. The first  
10 capacitor accordingly controls and limits the speed at which the gas ions move to the insulating layer surface to etch this surface. The resultant etch, only a relatively few angstroms, of the insulating layer is smooth, uniform and accurate.